Update on the National Water-Quality Monitoring Council

January 17, 2018

Advisory Committee on Water Information
Reston, VA

Gary Rowe
USGS Co-Chair

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Acknowledgements

- Susan Holdsworth (EPA Co-Chair)
- Candice Hopkins (NWQMC Exec Secretary)
- Various NWQMC work group co-chairs and team leads including:
  - Jim Kreft (USGS)
  - Laura Shumway (EPA)
  - Mary Skopec (Univ of Iowa)
  - Aaron Borisenko (OR DEQ)
  - Mike McHale (USGS)
  - Danielle Donkersloot (Izaak Walton League)
  - Julie Vastine, (ALLARM)
  - Other Council members, alternates, and friends of the Council who participate on the various Council work groups, and teams

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Council History

- 1991-USEPA and USGS began talks to address problems caused by different water-quality sampling, analytical, data storage, reporting, and assessment methods used by local, state, & Federal agencies.
- 1992-1997- Intergovernmental Task Force on Monitoring evaluated status of Nation's monitoring programs and recommended the Council be formed.
- 1997- ACWI formed; Council officially approved by ACWI.
- 1998-1st National Monitoring Conference in Reno, Nevada
- 2002- NEMI launched
- 2010- First Council Newsletter published
- 2012- Water-Quality Portal launched.
- 2016- 10th National Monitoring Conference in Tampa Bay, FL

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Council Goals

- Provide a national forum for coordination of comparable and scientifically defensible methods and strategies for improving water quality monitoring, assessment, and reporting.
- Bring together scientists, managers, and citizens to ensure information about the quality of our waters is accurate, reliable, and comparable.
- Foster collaborative and cost-effective approaches to improve and advance the science of water-resources monitoring.

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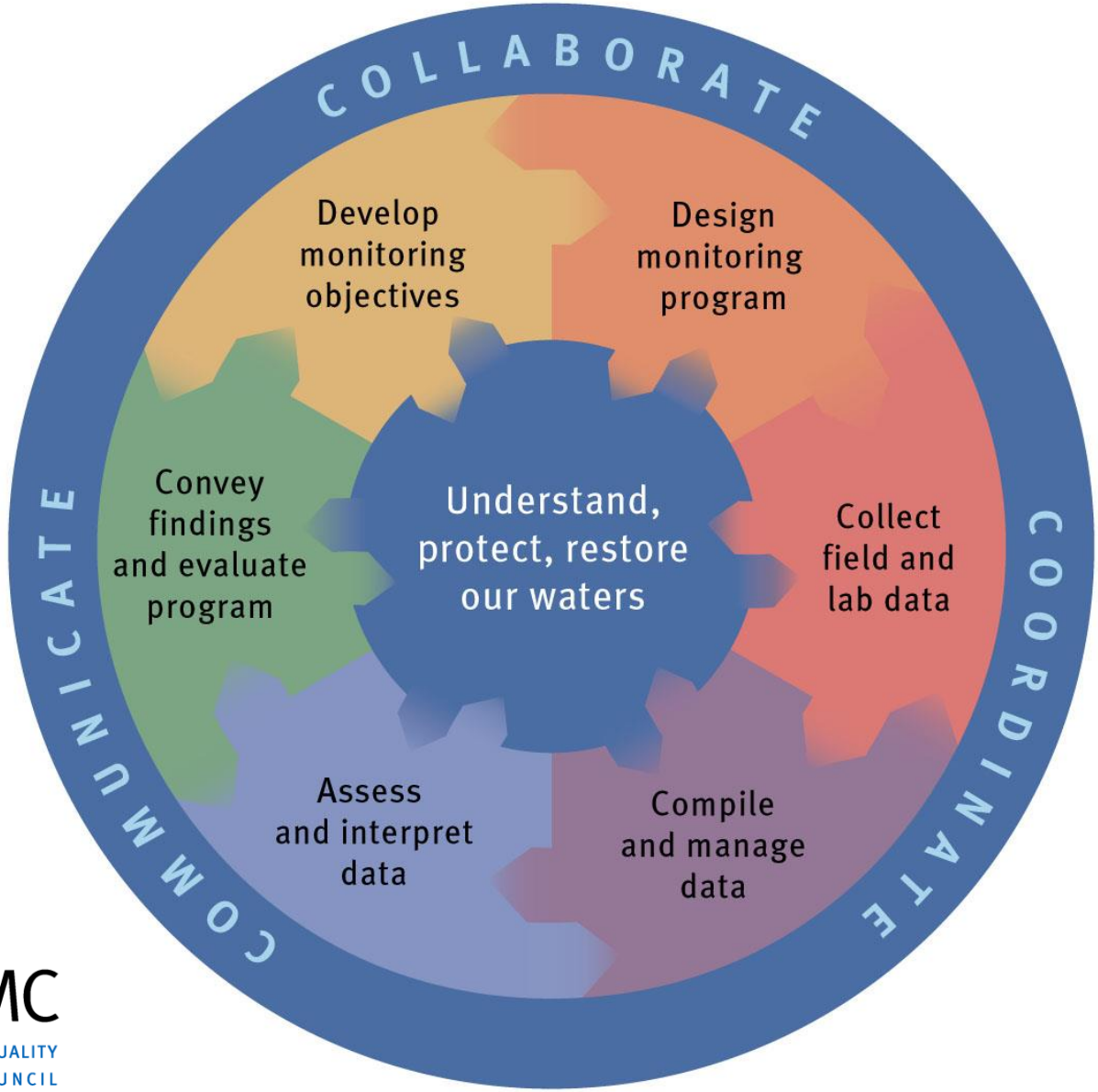
National Monitoring Framework



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Council Membership

- Federal Agencies
  - USEPA, USGS, NOAA, USDA (NRCS, USFS), USFWS, NPS, USCOE and TVA*
- States and Tribes
  - States representing USEPA Regions 1-10 (CT,NJ, VA, SC, WI, OK, KS, WY, CA, OR)
  - National Tribal Council (Fond du Lac Band of Lake Superior Chippewa)
- Other Organizations
  - Professional Organizations: ACWA, NACWA, NALMS, AASG, WEF, NCASI,
  - Interstate Organizations/Regional representatives-Great Lakes region, Gulf of Mexico*, River Basin Commission*
  - Academia-ASLO, CUAHSI

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*Existing Council vacancy

Council Products

- National Monitoring Conference (held biennially)
- Water Quality Portal
- National Environmental Methods Index (NEMI)
- Coordination with volunteer monitoring groups, and State, Regional and Tribal Councils,
- National Network of Reference Watersheds
- Council newsletter, webinars on various monitoring topics, coordinate with volunteer monitoring newsletter
- Fact sheets, technical reports and white papers on monitoring Issues

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National Monitoring Conference (NMC)

- NMCs are held every two years, rotate locations to showcase diverse water-quality issues
  - First NMC held in 1998 (Reno, NV)
  - Last NMC held in 2016 (Tampa Bay, FL)
- Attracts mix of federal, state, local, academic, industry, and volunteer monitoring participants
  - Attendance usually 700-800 (~1,100 at Portland in 2010)
- Conference features:
  - Oral and poster presentations,
  - Workshops, short courses, panels and discussion sessions
  - Interactive demos of data portals, websites, apps, software, and monitoring equipment
  - Extensive networking opportunities
  - Vendors

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Hot Topics at the 2016 NMC

- Harmful algal blooms (monitoring, assessment, research, prediction)
- Continuous water-quality monitoring—methods, QA/QC, data handling and storage, applications and case studies
- Enabling data sharing for States, tribes, citizen scientists, volunteers, and other local watershed groups
- Nutrients loading to coastal estuaries — evaluating impacts on ecosystems and effectiveness of nutrient reduction efforts
- Assessing long-term trends in water-quality and their causes
- Training on data portals, trend analysis, statistical packages (R)
- Effective communication of science to managers/public
- Application of remote-sensing methods to QW monitoring
- Emerging contaminants in surface water and groundwater

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Status of 11th National Monitoring Conference

- Originally scheduled for Spring 2018; (now Spring 2019)
- Anticipate lower attendance because of federal travel and budget constraints; this may reduce state and volunteer monitoring community participation (est. 400-500)
- Evaluating changes to conference format to attract different audience:
  - Reduce technical sessions,
  - increase training opportunities (esp. for young WQ professionals)
- Locations under consideration:
  - Primary candidate: Denver, CO (strong Federal presence locally)
  - Secondary candidates: Kansas City, KS; Albuquerque, NM

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Council Work Groups and Teams

- Methods and Data Comparability Board
  - Dan Sullivan (USGS)
- Aquatic Sensor Work Group
  - Dan Sullivan (USGS)
- Water Quality Portal (WQP) Team
  - Jim Kreft (USGS), Laura Shumway (EPA)
- Water Information Strategies (WIS) Work group
  - Mary Skopec (Univ of Iowa), Aaron Borisenko (OR DEQ),
- National Network of Reference Watersheds
  - Mike McHale (USGS)
- Volunteer Monitoring Work Group
  - Danielle Donkersloot (Izaak Walton League), Julie Vastine, (ALLARM)
- Collaboration and Outreach (C&O) Work Group
  - Candice Hopkins (USGS), Danielle Donkersloot (Izaak Walton League)

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Methods and Data Comparability Board

- Develop water-quality monitoring approaches that facilitate collaboration and data comparability across all data-gathering organizations.
- Develop products that enhance our ability to make the best use of the limited resources for WQ monitoring such as
  - National Environmental Methods Index (www.nemi.gov) now in it's 16th year with ~1,500 physical, chemical, biological methods and sampling protocols
- Oversees Aquatic Sensors work group that addresses SOPs for the calibration, QA/QC, maintenance, and deployment of new aquatic sensor technology
  - Illustrated Field Deployment Guide for Rivers and Streams

  (https://www.watersensors.org/pdfs/ASW-Field-Guide-Rivers-web.pdf)

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Methods and Data Comparability Board 2017 Progress

- Worked with WIS work group to define scope of new Biological Assessment and Comparability (BAC) team
  - Focus of BAC team is inventorying and comparing biological assessment protocols with initial focus on metadata issues between EPA and USGS databases
- Aquatic Sensors work group:
  - Collaborate on EPA Sensor Challenge (Toxicity)
  - Prepared summary report on results of a USGS workshop held last summer on continuous monitoring
- Continued to add biological protocols to NEMI and updated operating software

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Methods and Data Comparability Board 2018 Plans

- Biological Assessment Comparability
  - Restart methods comparison work on invert methods with goal of updating descriptions in NEMI
- Aquatic Sensors work group
  - Focus on developing training webinars
  - First "how to" webinar given on January 10, 2018 with over 270 attendees
  - Also looking to tackle uncertainty in continuous sensor measurements; exploring collaboration with existing NOAA IOOS QARTOD* project

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*QARTOD-Quality Assurance of Real-Time Oceanographic Data

A few notes on the Water Quality Portal…

- The WQP **is** standalone web-service that allows users to easily download USGS, USEPA, and USDA water-quality data from a single website
- The WQP **is not** an actual database**;** instead it retrieves data from over 400 local, state, and federal databases (USGS-NWIS, USEPA-STORET, USDA-STEWARDS)
- The WQP **includes** water-quality data only (physical, chemical, biological, and monitoring site metadata)
- The WQP **does not include** climatic (precip/snowpack), hydrologic (flow, groundwater levels), or water-use data
- Data **must be** organized and formatted using the Water-Quality Exchange (WQX) template
- We **are implementing** WQP 5-yr strategic plan finalized in 2017

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...before a more detailed WQP update by Jim Kreft

Water Information Strategies (WIS) Work group

- Defines and promotes strategies for
  - monitoring designs,
  - data management, access, and exchange,
  - data integration, analysis, and information reporting
- Provide technical support to other work groups
- Fact sheet series "*Water Quality Monitoring: A Guide for Informed Decision-Making*"
  - Fact sheets describing pros and cons of different monitoring designs (e.g. statistical vs targeted) and related topics
  - Intended for water-resource managers and the public

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Water Information Strategies Work Group 2017 Progress/2018 plans

- Worked with WQP team to
  - complete "*Getting started with the Water Quality Portal*" fact sheet, and prepare fact sheet on WQP web services
- Formed team to
  - develop metrics for evaluating progress of Council relative to functions assigned in Council Terms of Reference and
  - Report out on the evaluation in 2018
- Formed Water Quality Standards (WQS) team that will:
  - prepare fact sheet on how WQS's are developed and
  - Investigate feasibility of inventorying existing WQS's ontinued to add biological protocols to NEMI and updated operating software
- Formed Increasing Data Submission team focused on:
  - increasing data submission to the WQP that will identify strategies for submitting volunteer monitoring data to the WQP and
  - identifying sources of new WQ data not yet in the WQP

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Water Information Strategies Work Group

Training Series Project

- Done in collaboration with C&O work group
- Tasks identified included:
  - Develop and administer survey to Council members to identify core training needs for entry level water-quality professionals (completed)
  - Analyze survey results and provide presentation to council. (completed)
  - Develop a work plan based on feedback from the council on implementing next steps. (in progress)
  - Identify core training curriculum and implement at 2019 National Monitoring Conference (in progress)

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National Network of Reference Watersheds (NNWR)

- Allow users to search online database of reference sites, identify watersheds of interest, and download relevant information on:
  - Different measures of disturbance (hydrologic, landscape/land cover) that define degree of human impact on the watershed
  - Available flow, precipitation and water-quality data, the latter two provided by links to the WQP and NADP websites
- Increase the efficiency of monitoring through improved coordination and collaboration and increase opportunities to leverage existing reference sites, networks, and financial resources

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NNRW: Current Status

- Over 2500 watersheds with more than 10 years of flow data
- ~500 "core" NNRW watersheds that represent least disturbed sites across the county
- Ability to use pre-defined or customized criteria to select reference watersheds
- Download data for up to 50 watersheds at a time
- Link to data to nearest NADP atmospheric deposition data

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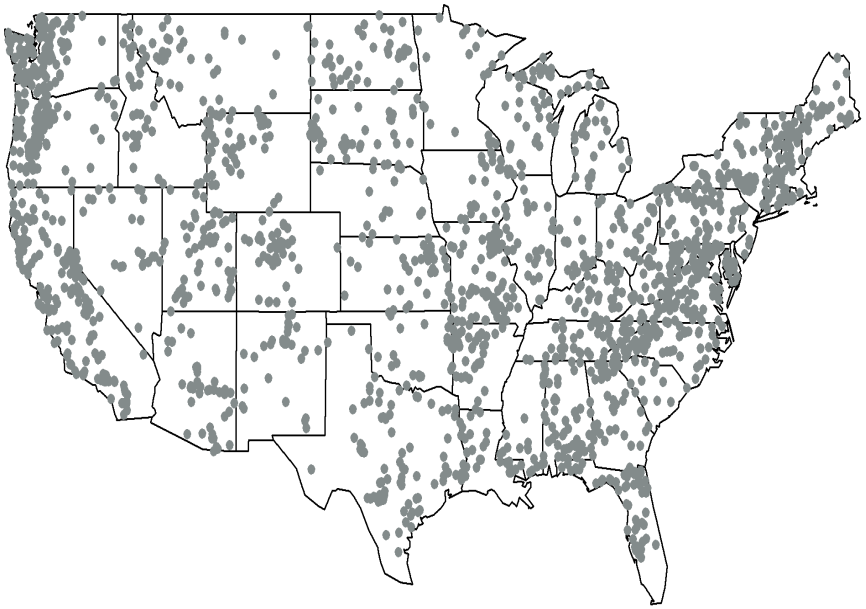
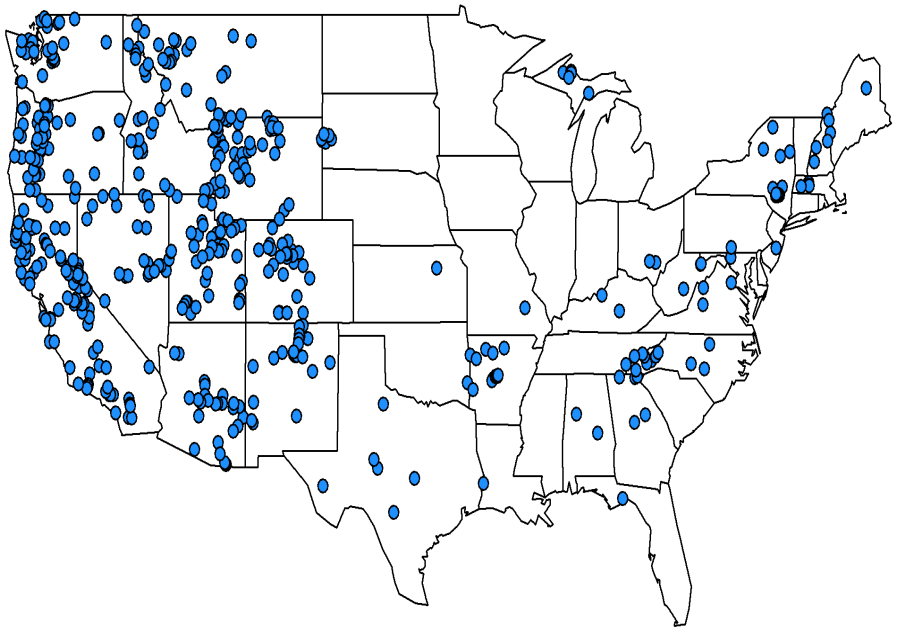
NNRW Current Site Maps



All Current NNRW sites
~2,500 sites with 10 years of streamflow data

Core (“best of best”) NNRW sites
~500 sites with 10 year of streamflow data; however many lack QW data



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NNRW: 2018 Plans

- Continue to add candidate watershed: add Forest Service Priority watersheds and EPA lake watersheds)
- Develop a revised Hydrologic Disturbance Metric
- Incorporate National Atmospheric Deposition Program Total Deposition data into the website
- Develop R analytical tools to compile and interpret water quality data in reference watersheds
- Revise the Core Watersheds webpage to include a more definitive set of National Core Reference Watersheds based on updated criteria

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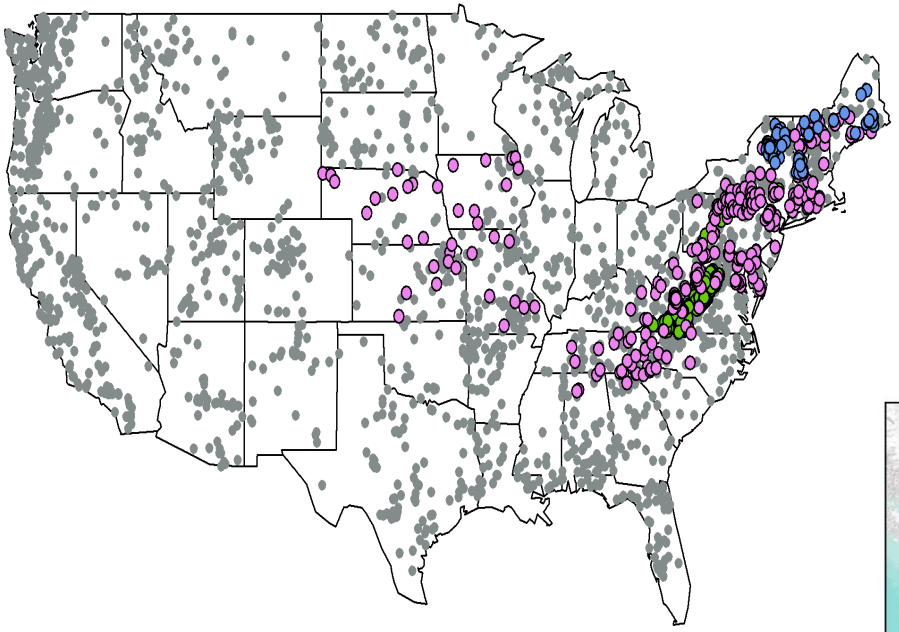
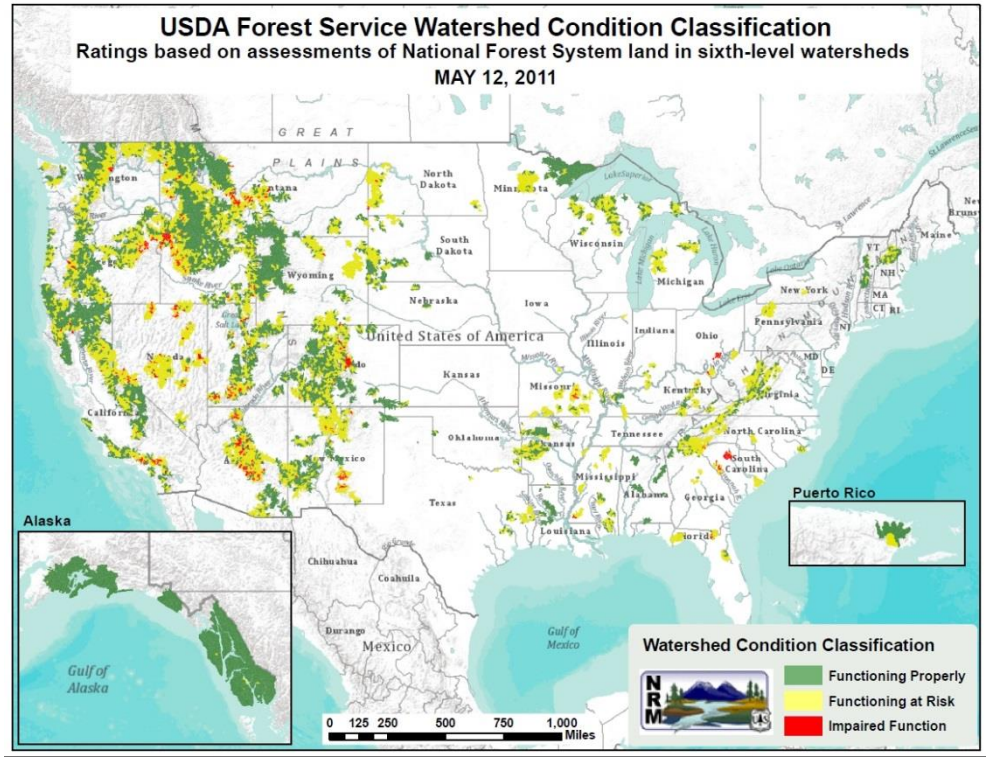
NNRW: Planned Additional Sites



EPA Long-term Monitoring Lake Watersheds (2018)

USFS Priority Watersheds (TBD)



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Volunteer Monitoring Workgroup

- Identify and address topics of high priority to volunteer monitoring practitioners:
- Examine existing avenues and develop new approaches to most effectively support volunteer monitoring initiatives across the country;
- Facilitate the sharing of relevant research and outreach tools, as well as Council resources to the volunteer monitoring community through the VM Network; and
- Promote volunteer monitoring as a viable tool for agencies and organizations.

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Volunteer Monitoring Work Group
2017 Progress

- Partnering with C&O to promote VM-related webinars and newsletter articles
- Worked to identify conference synergies with River Rally and Citizen Science Association
- Attended May 2017 Citizen Science Association Conference, explored collaborative opportunities with CSA
- Establishing community of practice for VM groups wrt to study designs, QAPPs, meta data requirements etc.

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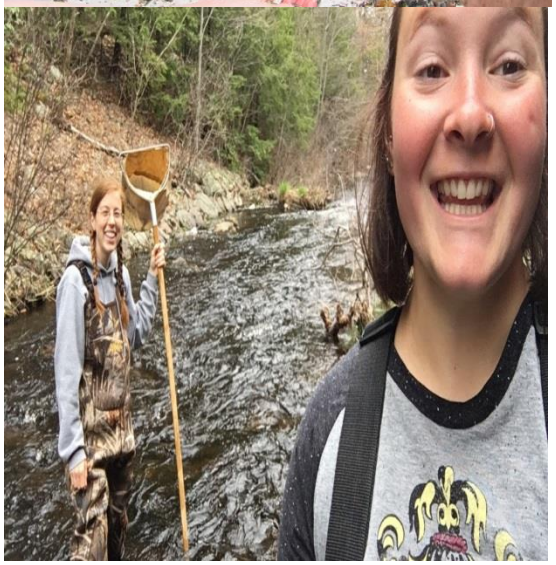
Volunteer Monitoring Work Group 2018 Plans

- Increase Volunteer Data Submission to WQX through working with WIS
  - Research and develop a shared common language for volunteer monitoring data
- Populate NEMI with common volunteer field methods
- Update Volunteer Monitoring links on Council's website
- ID resources to support VM coordinator attendance at 11th NMC
- Continue VM-related outreach via webinars, newsletter articles



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Collaboration and Outreach (C&O) Workgroup

- Works to build partnerships that foster collaboration and communication within the water-quality monitoring community
- Supports state and regional water quality monitoring councils (~20 active Councils)
- Coordinates with Volunteer Monitoring community including Volmon newsletter
- Responsible for sharing publications (newsletter), meetings (recorded Webex), and web seminars

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C&O Work Group-Ongoing Activities

- Manage Council social media Accounts, (e.g. YouTube) and website
- Issue bi-annual newsletter that is sent to 9,000 water-quality monitoring professionals
- Host webinars (12 webinars in 2017, with upwards of 500 live attendees)
- Expand communication to state, tribal, and local monitoring councils
- Water Quality Portal outreach
- Develop briefing materials for Council members

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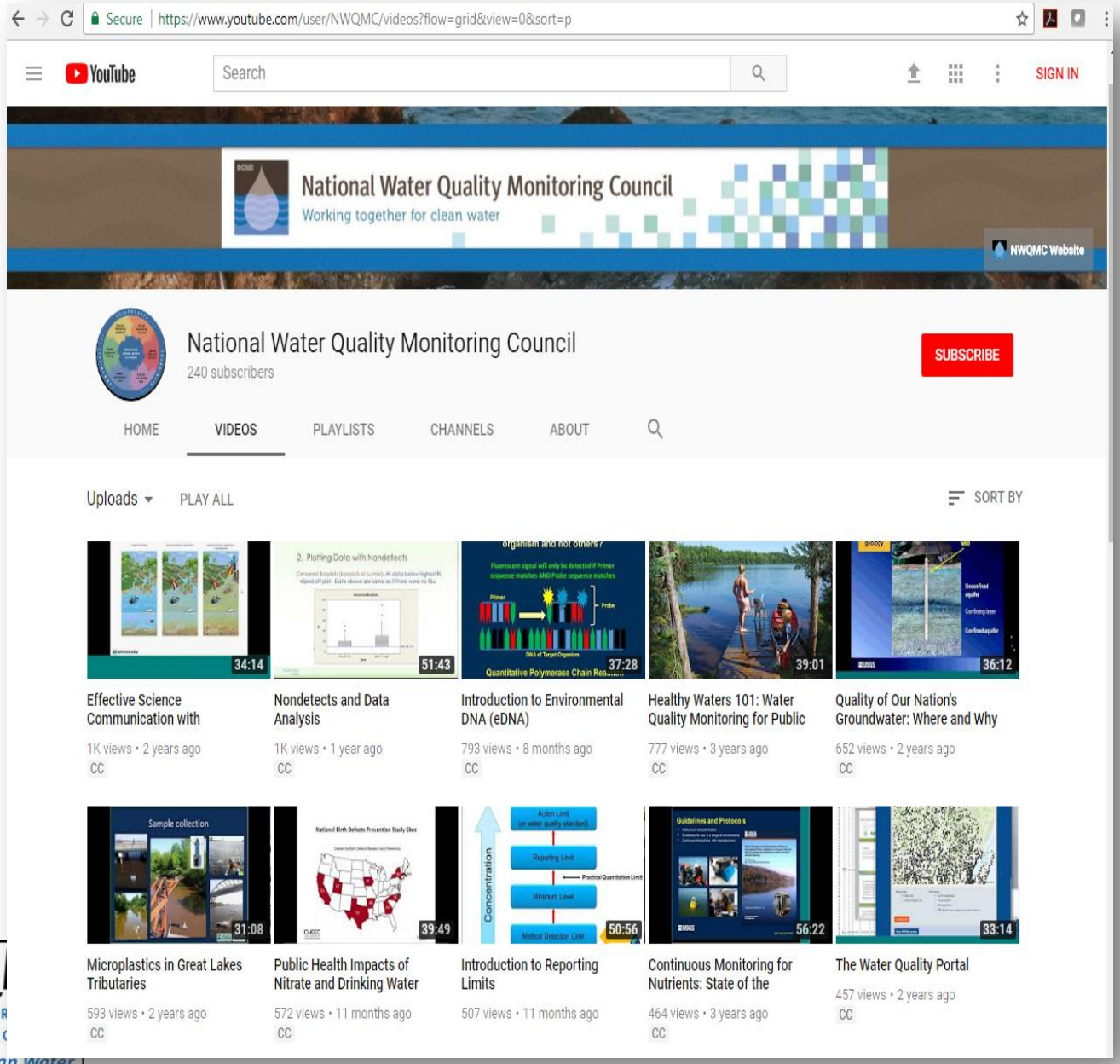
Council YouTube Channel



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2017 NWQMC-Hosted Webinars

- Nutrient Surrogate for Computing Continuous Loads
- Introduction to Reporting Limits
- Public Health Impacts of Nitrate and Other Drinking Water Contaminants
- The Assessment and Regulation of PFASs in New Hampshire's Drinking Water
- Volunteer Monitoring: Starting Strong
- Introduction to Environmental DNA (eNDA)
- Changing Pesticide Use: Challenges for Water-Quality Monitoring and Ecological Implications
- Multivariate Statistical Analysis in Water Quality
- Nondetects and Data Analysis
- Potential Corrosivity in US Rivers and Links to Elevated Lead in Drinking Water
- State Uses of Volunteer monitoring Data
- Long-Term Look at Changes in the Quality of our Nation's Rivers and Streams

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Council Newsletter

National Water Monitoring News

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Highlights

- National Council Highlights
- Spotlight on the Subcommittee on Ground Water
- Collaboration Through Partnerships
- Spotlight on States
- Volunteer Monitoring
- Tribal News
- Tools and Technology
- Upcoming Conferences and Workshops

The National Water Quality Monitoring Council brings together scientists, managers, and citizens to ensure information about the quality of our water resources is accurate, reliable, and comparable. The Council fosters collaborative and cost-effective approaches to improve and advance the science of water-resources monitoring.

Students from the Ocean Research College Academy measuring dissolved oxygen and collecting samples for nutrient analysis in Puget Sound. *(Photos courtesy of Katherine Dye, Everett Community College.)*

National Water Monitoring News

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Highlights

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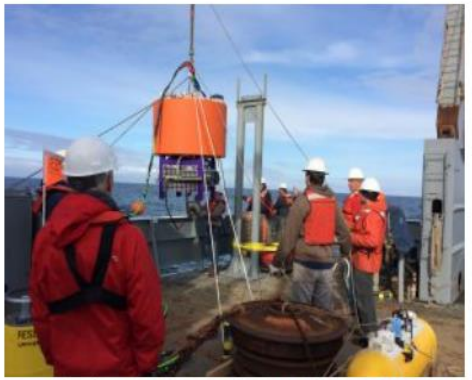

Scientists and crew from NOAA and the University of Washington deploy the ESP with HAB species and toxin sensors off the coast of Washington. *(Photo Credit: University of Washington)*

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Scientists offload the Environmental Sample Processor for a dockside checkout of the instrument and its microcystin sensor. (Photo Credit: NOAA)

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Challenges for the Council

- Anticipated downturn in National Monitoring Conference attendance related to reduced budgets and travel caps
  - Explore new format for 2019 NMC to attract new participants
- Upgrading the WQP with limited resources
  - Basic upgrades versus “bells and whistles”
- Improving metadata to increase secondary use of data
  - Work to improve metadata documentation via upgrades to WQX
- Keeping pace with advances in monitoring technology
  - New sensors, AUVs, drones, crowdsourcing, apps
- Evaluating uncertainty in monitoring data
  - Uncertainty and how to evaluate it varies significantly for different data types, constituents, and monitoring designs
- Effectively communicating results and implications of monitoring data to water managers and public at time many citizens question value of our work

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Additional Information

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Council Executive Secretary: Candice Hopkins

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Council website:
http://water.usgs.gov/wicp/acwi/monitoring/

Water Quality Portal:

http://www.waterqualitydata.us/

Council Workgroup websites:

http://acwi.gov/monitoring/workgroups/index.html